

What is claimed is:

1. An ejector cycle system comprising:

a compressor for sucking and compressing refrigerant;

an exterior heat exchanger that performs heat exchange between refrigerant and outside air of a compartment;

an interior heat exchanger that performs heat exchange between refrigerant and air to be blown into the compartment;

an ejector including a nozzle for decompressing and expanding refrigerant at a high pressure side, the ejector being provided to suck evaporated refrigerant at a low pressure side from a low-pressure suction port by a high speed stream of refrigerant jetted from the nozzle, and to increase pressure of refrigerant to be sucked into the compressor by converting expansion energy to pressure energy;

a gas-liquid separator for separating refrigerant flowing out of the ejector into gas refrigerant and liquid refrigerant, the gas-liquid separator having a gas refrigerant outlet from which the gas refrigerant is supplied to the compressor and a liquid refrigerant outlet from which the liquid refrigerant is supplied to the low pressure side;

a bypass means through which refrigerant discharged from the compressor is decompressed and introduced to the interior heat exchanger while bypassing the exterior heat exchanger and the ejector; and

a switching device for switching one of a cooling mode where refrigerant discharged from the compressor is supplied to the exterior heat exchanger, and a hot gas heating mode where the

refrigerant discharged from the compressor is supplied to the interior heat exchanger through the bypass means,

wherein the interior heat exchanger is coupled to the ejector such that refrigerant flowing out of the interior heat exchanger is introduced into at least a refrigerant inlet of the nozzle in the hot gas heating mode.

2. The ejector cycle system according to claim 1, wherein the interior heat exchanger is coupled to the ejector such that refrigerant flowing out of the interior heat exchanger is introduced to both of the low-pressure suction port of the ejector and the refrigerant inlet of the nozzle in the hot gas heating mode.

3. The ejector cycle system according to claim 1, wherein the ejector includes an adjustment member for adjusting a throttle opening degree of the nozzle.

4. The ejector cycle system according to claim 1, wherein the interior heat exchanger includes a first heat exchanging portion, and a second heat exchanging portion arranged upstream of the first heat exchanging portion in an air flow direction; and

the first heat exchanging portion is positioned upstream of the second heat exchanging portion in a refrigerant flow of the interior heat exchanger in each of the cooling mode and the hot gas heating mode.

5. The ejector cycle system according to claim 1, further comprising a flow rate adjusting device for adjusting an amount of refrigerant flowing into the nozzle based on a thermal load in the interior heat exchanger.

6. The ejector cycle system according to claim 1, wherein carbon dioxide is used as refrigerant.

7. The ejector cycle system according to claim 1, wherein the compressor is operated to set a super-critical operation mode where the refrigerant discharged from the compressor has a pressure equal to or higher than the critical pressure of the refrigerant.

8. An ejector cycle system comprising:
a compressor for sucking and compressing refrigerant;
an exterior heat exchanger that performs heat exchange between refrigerant and outside air of a compartment;
an interior heat exchanger that performs heat exchange between refrigerant and air to be blown into the compartment;
an ejector including a nozzle for decompressing and expanding refrigerant at a high pressure side and a pressurization portion having a low-pressure suction port from which refrigerant evaporated at a low pressure side is sucked by a high speed stream of refrigerant jetted from the nozzle, the pressurization portion being provided to mix the refrigerant sucked from the low-pressure suction port and the refrigerant jetted from the nozzle and to increase pressure of refrigerant to be sucked into the compressor

by converting expansion energy to pressure energy;

a gas-liquid separator for separating refrigerant flowing out of the ejector into gas refrigerant and liquid refrigerant, the gas-liquid separator having a gas refrigerant outlet from which the gas refrigerant is supplied to the compressor and a liquid refrigerant outlet from which the liquid refrigerant is supplied to the low pressure side; and

a switching device for switching one of a cooling mode and a hot gas heating mode, wherein:

in the cooling mode, refrigerant discharged from the compressor flows through the exterior heat exchanger, the nozzle, the pressurization portion and the gas-liquid separator in this order, while liquid refrigerant in the gas-liquid separator flows into the interior heat exchanger and gas refrigerant in the interior heat exchanger is sucked into the pressurization portion from the low-pressure suction port; and

in the hot gas heating mode, refrigerant discharged from the compressor flows into the nozzle, is introduced into the interior heat exchanger through the low-pressure suction port, and flows into the gas-liquid separator, while bypassing the exterior heat exchanger.

9. The ejector cycle system according to claim 8, wherein:
the ejector includes a housing portion for defining at least a part of the pressurization portion;

the nozzle is disposed in the housing portion to have a clearance between an inner wall of the housing and an outer wall of the nozzle;

and

the clearance is provided in such a manner than refrigerant discharged from the nozzle is supplied to the interior heat exchanger through the clearance in the hot gas heating mode.

10. The ejector cycle system according to claim 8, wherein the ejector includes an adjustment member for adjusting a throttle opening degree of the nozzle.

11. An ejector cycle system comprising:
a compressor for sucking and compressing refrigerant;
an exterior heat exchanger that performs heat exchange between refrigerant and outside air of a compartment;
an interior heat exchanger that performs heat exchange between refrigerant and air to be blown into the compartment;
an ejector including a nozzle for decompressing and expanding refrigerant at a high pressure side and a pressurization portion having a low-pressure suction port from which refrigerant evaporated at a low pressure side is sucked by a high speed stream of refrigerant jetted from the nozzle, the pressurization portion being provided to mix the refrigerant sucked from the low-pressure suction port and the refrigerant jetted from the nozzle and to increase pressure of refrigerant to be sucked into the compressor by converting expansion energy to pressure energy;
a gas-liquid separator for separating refrigerant flowing out of the ejector into gas refrigerant and liquid refrigerant, the gas-liquid separator having a gas refrigerant outlet from which

the gas refrigerant is supplied to the compressor and a liquid refrigerant outlet from which the liquid refrigerant is supplied to the low pressure side; and

a switching device for switching one of a cooling mode and a hot gas heating mode, wherein:

the ejector includes a housing portion for defining at least a part of the pressurization portion;

the nozzle is disposed in the housing portion to have a clearance between an inner wall of the housing and an outer wall of the nozzle;

in the cooling mode, refrigerant discharged from the compressor flows through the exterior heat exchanger, the nozzle, the pressurization portion and the gas-liquid separator in this order, while liquid refrigerant in the gas-liquid separator flows into the interior heat exchanger and refrigerant evaporated in the interior heat exchanger is sucked into the pressurization portion from the low-pressure suction port; and

in the hot gas heating mode, refrigerant discharged from the compressor is introduced into the clearance while bypassing the exterior heat exchanger, and flows into the interior heat exchanger from the ejector.

12. The ejector cycle system according to claim 11, wherein:

in the cooling mode, refrigerant discharged from an outlet of the ejector flows into the gas-liquid separator; and

in the hot gas heating mode, refrigerant discharged from the compressor is introduced into the clearance from the outlet of the ejector, and flows into the interior heat exchanger through the low-pressure inlet port.